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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/760,652	01/20/2004	Gregory Edward Tierney	200313614-1	9868

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EXAMINER

CHERY, MARDOCHEE

ART UNIT	PAPER NUMBER
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2188

DATE MAILED: 07/25/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/760,652	Applicant(s) TIERNEY ET AL.	
	Examiner Mardochee Chery	Art Unit 2188	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 January 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-35 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-35 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 19 January 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Objections

1. Claim 31 is objected to because of the following informalities: it appears that claim 31 should depend on claim 30 instead of 32. Appropriate correction is required.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claim 33 recites the limitation "the other target nodes" in line 3. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1-6, 8-9, and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cypher (2004/0002992) in view of Hum (6,922,756).

As per claim 1, Cypher discloses a system comprising: a first node operative to provide a source broadcast requesting data [Fig. 2A, ¶¶ 7, ll 1-7], the first node associating an F-state with a copy of the data in response to receiving the copy of the

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data from memory and receiving non-data responses from other nodes in the system [¶¶ 7, ll 7-13; ¶¶ 8, ll 9-14; ¶¶ 68, ll 4-22], the non-data responses including an indication that at least a second node includes a shared copy of the data [¶¶ 68; ll 1-11], the F-state enabling the first node to serve as an ordering point in the system [Fig. 1; ¶¶ 75-76].

As per claim 1, Cypher does not specifically teach an F-state capable of responding to requests from the other nodes in the system with a shared copy of the data as required.

Hum discloses an F-state capable of responding to requests from the other nodes in the system with a shared copy of the data [col. 3, ll 6-11; col. 5, ll 66 to col. 6, ll 1] to permit a shared data to be transmitted from the current owning system component to the requesting system component without any concern of multiple data copies received at the requesting system component [col. 3, ll 7-9].

Since the technology for implementing a cache memory system with an F-state capable of responding to requests from the other nodes in the system with a shared copy of the data was well known as evidenced by Hum, an artisan would have been motivated to implement this feature in the system of Cypher to permit a shared data to be transmitted from the current owning system component to the requesting system component without any concern of multiple data copies received at the requesting system component. Thus, it would have been obvious to one of ordinary skill in the art at the time of invention by Applicant to modify the system of Cypher to include an F-state capable of responding to requests from the other nodes in the system with a

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shared copy of the data since this would have permitted a shared data to be transmitted from the current owning system component to the requesting system component without any concern of multiple data copies received at the requesting system component [col. 3, ll 7-9] as taught by Hum.

As per claim 2, Cypher discloses the non-data responses further comprise an indication that the other nodes in the system do not have a copy of the data requested by the first node [¶¶. 69].

As per claim 3, Cypher discloses the source broadcast requesting the data comprises a non-ownership request for the data [Fig. 4; ¶¶ 68; ll 1-9].

As per claim 4, Cypher discloses the non-ownership request comprises a source broadcast read request [¶¶. 7; ll 1-3, 10-16; ¶¶ 68].

As per claim 5, Cypher discloses the first node comprises a first processor having an associated cache that comprises plurality of cache lines, one of the cache lines having an address associated with the copy of data received from memory and state data that defines the state of the data stored in the one of the cache lines [Fig. 4].

As per claim 6, Cypher discloses the first processor further comprises a cache

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controller that controls the state of the data stored in the plurality of cache lines [Fig. 2A].

As per claim 8, Cypher discloses each node defines a processor having an associated cache that comprises a plurality of cache lines, each cache line having a respective address that identifies associated data and state information that indicates a state of the associated data for the respective cache line, each of the processors being capable of communicating with each other via an interconnect [Fig. 2A].

As per claim 9, Cypher discloses a cache controller associated with each cache for managing data requests and responses for the respective cache [Fig. 2A; *Controllers 210A-210B*].

As per claim 13, Cypher discloses the ordering point defined by the F-state migrates from the first node to another node in response to the another node issuing a source broadcast non-ownership request for a copy of the data [pars. 75-76].

6. Claims 7, 10, 31, and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cypher (2004/0002992) in view of Hum (6,922,756) and further in view of Hum (2004/0123047).

As per claim 7, Hum discloses the cache controller is capable of evicting the data stored in the one of the cache lines by modifying the state information from the F-state to an invalid state for the data [Abstract; col. 5, ll 57-65].

However, Cypher and Hum do not specifically teach silently evicting the data stored in the one of the cache lines as required.

Hum (2004/0123047) discloses silently evicting the data stored in the one of the cache lines [par. 65, ll 6-8] so the agent may not be aware that all copies have been evicted (par. 65, ll 7-10).

Since the technology for implementing a cache system with silently evicting the data stored in the one of the cache lines was well known as evidenced by Hum (047), an artisan would have been motivated to implement this feature in the system of Cypher and Hum (756). Thus, it would have been obvious to one of ordinary skill in the art at the time of invention by Applicant to modify the system of Cypher and Hum (756) to include silently evicting the data stored in the one of the cache lines since this would have enabled the agent not be aware that all copies have been evicted (par. 65, ll 7-10) as taught by Hum (047).

As per claim 10, the rationale in the rejection 7 is herein incorporated.

As per claim 31, the rationale in the rejection of claim 7 is herein incorporated.

As per claim 35, the rationale in the rejection of claim 10 is herein incorporated. Cypher further discloses the memory comprises a home node for the data requested by the source node, the method further comprising: sending an instruction from the source node having the F-state to block the home node from responding with data to a subsequent non-ownership request for the data if the first node provides a response to the subsequent non-ownership request includes a shared copy of the data [par. 70].

7. Claims 11, 12, 14-15, 17-30, and 32-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cypher (2004/0002992) in view of Hum (6,922,756) and further in view of Arimilli (6,138,218).

As per claim 11, Cypher and Hum (756) disclose the claimed invention as discussed above in the previous paragraphs. However, Cypher and Hum (756) do not specifically teach the system implements a source broadcast protocol to process requests and responses provided by nodes within the system, the system transferring to an associated forward progress protocol in response to a request failing in the source broadcast protocol as required.

Arimilli discloses the system implements a source broadcast protocol to process requests and responses provided by nodes within the system, the system transferring to an associated forward progress protocol in response to a request failing in the source broadcast protocol [col. 6, ll 39-45 and 54-64] to obviate the need for subsequent interventions (col. 6, ll 48-50).

Since the technology for implementing a cache memory system with the system implementing a source broadcast protocol to process requests and responses provided by nodes within the system, the system transferring to an associated forward progress protocol in response to a request failing in the source broadcast protocol was well known as evidenced by Arimilli, an artisan would have been motivated to implement this feature in the system of Cypher and Hum (756) in order to obviate the need for subsequent interventions. Thus, it would have been obvious to one of ordinary skill in the art at the time of invention by Applicant to modify the system of Cypher and Hum (756) to include a source broadcast protocol to process requests and responses provided by nodes within the system, the system transferring to an associated forward progress protocol in response to a request failing in the source broadcast protocol since this would have helped obviated the need for subsequent interventions (col. 6, ll 48-50) as taught by Arimilli.

As per claim 12, Arimilli discloses the forward progress protocol comprises a directory-based protocol [col. 1, ll 35-40].

As per claim 14, the rationale in the rejection of claims 1 and 3 is herein incorporated.

However, Cypher and Hum (756) do not specifically teach transitioning from the first state to a second state indicating that the data is shared; and the second node transitioning to a third state in response to receiving the shared copy of the data from the first node, such that the second node becomes an ordering point in the network for providing a shared copy of the data as required.

Arimilli discloses transitioning from the first state to a second state indicating that the data is shared [col. 5, ll 60-67]; and the second node transitioning to a third state in response to receiving the shared copy of the data from the first node, such that the second node becomes an ordering point in the network for providing a shared copy of the data [col. 6, ll 1-15] to make forward progress towards an ultimate state on retried snoop operations (col. 1, ll 10-15).

Since the technology for implementing a cache memory system with transitioning from the first state to a second state indicating that the data is shared was well known as evidenced by Arimilli, an artisan would have been motivated to implement this feature in the system of Cypher and Hum (756) in order to make forward progress towards an ultimate state on retried snoop operations. Thus, it would have been obvious to one of ordinary skill in the art at the time of invention by Applicant to modify the system of Cypher and Hum (756) to include transition from the first state to a second state indicating that the data is shared since this would have made forward progress

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towards an ultimate state on retried snoop operations (col. 1, ll 10-15) as taught by Arimilli.

As per claim 15 the rationale in the rejection of claim 5 is herein incorporated.

As per claim 17 the rationale in the rejection of claim 11 is herein incorporated.

As per claim 18, Cypher discloses the forward progress protocol comprises a directory-based protocol [par. 7, ll 1-5].

As per claim 19, Arimilli discloses the third state and the second state are the same [col. 3, ll 17-25].

As per claim 20, the rationale in the rejection of claims 1 and 14 is herein incorporated.

As per claim 21, Cypher discloses at least one other processor having an associated cache that does not include a valid copy of the desired data, the at least one other processor responding to the broadcast request with a response indicating that the at least one other processor does not include a valid copy of the desired data [¶¶. 69].

As per claim 23, the rationale in the rejection of claim 3 is herein incorporated.

As per claim 24, the rationale in the rejection of claim 4 is herein incorporated.

As per claim 25, the rationale in the rejection of claim 11 is herein incorporated.

As per claim 26, the rationale in the rejection of claim 20 is herein incorporated.

As per claim 27, Cypher discloses the means for enabling defines an ordering point in the system for responding to non-ownership requests for the data, the system further comprising means for migrating the ordering point from the first node to another node in the system in response to a non-ownership request for the data provided by the another node [pars. 75-76].

As per claim 28, the rationale in the rejection of claim 11 is herein incorporated.

As per claim 29, Cypher discloses the memory comprises a home node for the requested data, the system further comprising means for blocking the home node from responding with data to another request if the first node provides a response to the another request that includes a shared copy of the data [Fig. 4; ¶¶ 68; ll 1-9].

As per claim 30, the rationale in the rejection of claim 26 is herein incorporated.

As per claim 32, Cypher discloses moving the ordering point for the data from the source node to another node in response to a non-ownership request for the data provided by the another node [pars. 75-76].

As per claim 33, the rationale in the rejection of claim 5 is herein incorporated.

As per claim 34, the rationale in the rejection of claim 11 is herein incorporated.

8. Claims 16 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cypher (2004/0002992) in view of Hum (6,922,756), Arimilli (6,138,218), and further in view of Hum (2004/0123047).

As per claim 16, the rationale in the rejection of claim 10 is herein incorporated.

As per claim 22, the rationale in the rejection of claim 16 is herein incorporated.

Conclusion

9. When responding to the office action, Applicant is advised to clearly point out the patentable novelty that he or she thinks the claims present in view of the state of the art disclosed by references cited or the objections made. He or she must also show how the amendments avoid such references or objections. See 37 C.F.R. 1.111(c).

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10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mardochee Chery whose telephone number is (571) 272-4246. The examiner can normally be reached on 8:30A-5:00P.

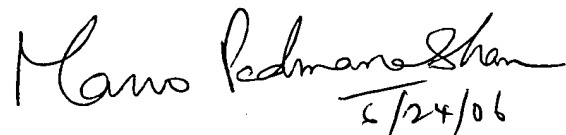
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Manonama Padmanabhan can be reached on (571) 272-4210. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

June 22, 2006



Mardochee Chery
Examiner
AU 2188


6/24/06

MANO PADMANABHAN
SUPERVISORY PATENT EXAMINER